

**National Center for Complementary and Alternative Medicine
Research Training and Career Development Programs:
An Early Assessment**

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National Center for Complementary and Alternative Medicine Research Training and Career Development Programs: An Early Assessment

Executive Summary

This report summarizes the deliberations, findings, and recommendations of a working group of experts convened May 24–25, 2004, by the director of the National Center for Complementary and Alternative Medicine (NCCAM) to review the content and focus of NCCAM’s research training and career development programs. This assessment was prompted by the evolution of these programs since the Center’s founding in 1998 and coincided with the development of NCCAM’s second five-year strategic plan.

Charge to the Working Group

The members of the working group were asked to reflect on NCCAM’s current approach to research training and career development in complementary and alternative medicine (CAM) and how the Center might maximize the impact of its investments. Because NCCAM’s programs have not been established long enough for many students, fellows, and new investigators to have completed research training, the working group’s charge did not extend to assessing training outcomes. Instead, the group was asked to consider issues such as:

- How NCCAM can best target its research training resources, given that its research interests overlap with those of other NIH Institutes and Centers
- Whether NCCAM’s current funding is appropriately allocated among predoctoral and postdoctoral training and career development opportunities
- The most effective approaches for preparing specific groups of investigators for research in complementary and alternative medicine, such as clinical researchers, CAM practitioners, and underrepresented minorities

An Overview of NCCAM Research Training and Career Development Programs

A Brief History of NCCAM Research Training

When Congress established NCCAM in 1998, it sought to ensure that the Center would have a skilled cadre of investigators to carry out its research mission. Accordingly, it authorized NCCAM to provide research training and career development opportunities through established NIH award programs.

In selecting *which* of these existing NIH training and career development awards to offer, NCCAM was mindful of the diversity of the individuals attracted to research in complementary and alternative medicine. As a result, NCCAM opted to provide a variety of opportunities to predoctoral students, postdoctoral fellows, and faculty through both individual and institutional awards (Figure 1).

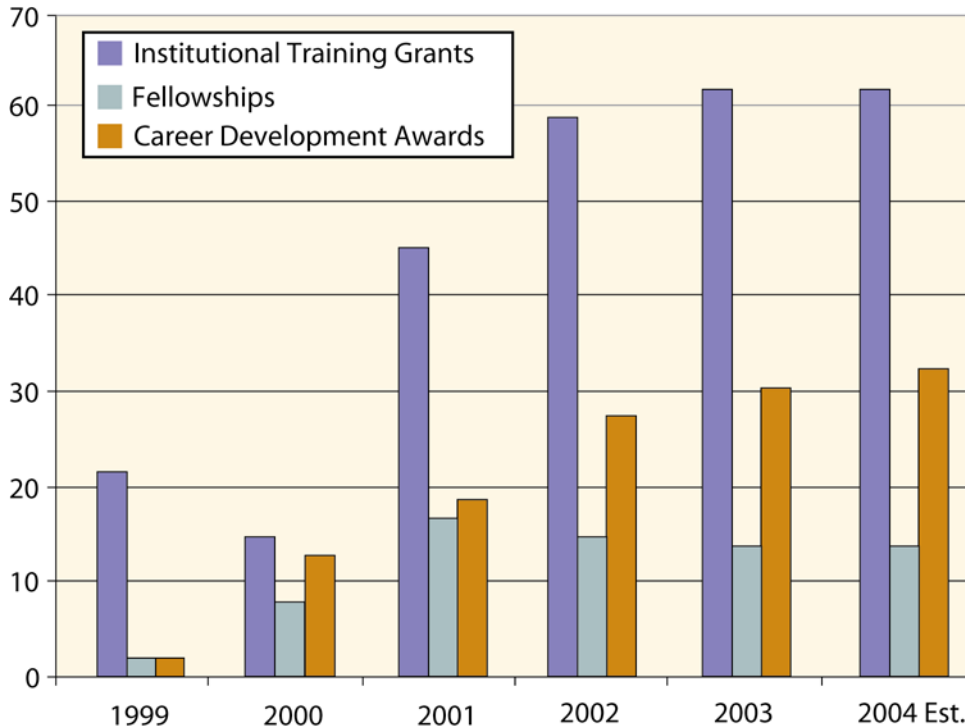


Figure 1. Number of individuals in training through NCCAM-supported research training and career development programs, FY 1999–2004.

Research Training at Other NIH Institutes and Centers

When NCCAM entered the field of research training, its programs took their place alongside a range of institutional training grants, fellowships, and career development awards that had been developed by the existing NIH Institutes over many years. To some extent, the historical roots of those programs continue to shape the organization of NIH’s training and career development activities to this day.

For example, when the NIH division that would later become the National Institute of General Medical Sciences (NIGMS) was founded in the late 1950s, it took on the responsibility for much of NIH’s predoctoral research training in the basic biomedical sciences.¹ Today, NIGMS supports more than 40 percent of the predoctoral trainees receiving assistance from NIH. Among the fields in which NIGMS has long offered institutional training programs for graduate students are the cellular, biochemical, and molecular sciences, genetics, and pharmacology.²

Although on a much smaller scale than NIGMS, the National Institute of Mental Health (NIMH) also has a history of supporting predoctoral research training and is the primary NIH source of support for graduate students in psychology.³

While NIGMS and, to a lesser extent, NIMH emphasize predoctoral research training, many of the other NIH Institutes tend to place somewhat higher priority on postdoctoral training for Ph.D.s and physicians in areas related to their missions.⁴ Disease-specific Institutes such as the National Cancer Institute, the National Heart, Lung, and Blood Institute, the National Institute of Diabetes and Digestive and Kidney Diseases, and the National Institute of Arthritis and Musculoskeletal and Skin Diseases are some of the leading NIH Institutes focusing on postdoctoral research training.⁵

Trans-NIH Issues and Trends Affecting the Research Workforce

Because developments in the research workforce have implications for all of NIH's Institutes and Centers, concerted efforts have been made across NIH in recent years to address several potentially troubling trends in the workforce, such as:

- The declining numbers of physicians and other health care professionals pursuing research training and careers in clinical research;
- The growing population of postdoctoral Ph.D.s in the basic biomedical sciences and the obstacles they face in making the transition to independent positions; and
- The continuing challenge of ensuring a diverse medical research workforce.

Beginning in the late 1990s, NIH mounted a campaign to reverse the declining numbers of physicians and other health care professionals in clinical research by introducing extramural programs such as loan repayment for clinical investigators, career development awards in patient-oriented research for new (K23) and mid-career (K24) investigators, and curriculum development (K30) awards for institutions developing or enhancing clinical research training programs. More recently, a number of NIH Institutes have also introduced institutional (K12) awards to support the career development of clinical and patient-oriented investigators. NCCAM currently offers K23 and K24 career development awards for patient-oriented researchers and participates in the NIH-wide loan repayment and curriculum development programs.

To improve conditions for new Ph.D.s, stipend levels for first-year postdoctoral fellows pursuing research training have increased NIH-wide by almost one-third since 2000. Furthermore, a growing number of NIH Institutes have begun to offer career transition (K22) awards to support postdoctoral fellows as they navigate the passage to faculty status. NCCAM's stipend levels have increased along with those of the rest of NIH, but NCCAM has not yet determined whether to offer a career transition award.

Finally, NIH has devoted substantial effort and funds over the past several decades to increasing the proportion of underrepresented minorities in research, thus far with only

modest success. This issue is a particularly challenging one for NCCAM, as the minority populations that are underrepresented in medical research are just as—if not more—underrepresented in CAM professions. A 2002 study of the characteristics of licensed CAM practitioners found that less than 5 percent of practitioners of acupuncture, chiropractic, or naturopathic medicine were Hispanic, and less than 2 percent were African American.⁶ To help recruit underrepresented minorities into CAM research, in 2001 NCCAM introduced a program of institutional training grants (T32s) for minority-serving institutions, but it is not yet clear what impact those training grants will have.

An Overview of NCCAM's Current Training and Career Development Portfolio

As part of the Ruth L. Kirschstein National Research Service Award (NRSA) program, NCCAM offers individual fellowship awards (F31s and F32s) to graduate students and postdoctoral fellows seeking training in CAM research. In FY 2003, NCCAM supported 14 individual fellows, most of whom were predoctoral students. At the postdoctoral level, NCCAM has awarded fellowships to individuals from both CAM and conventional medical and scientific backgrounds.

In addition to individual fellowships, NCCAM supports the research training of approximately 60 predoctoral students and postdoctoral fellows through institutional training grants (T32s), again as part of the NIH-wide NRSA program. NCCAM funded institutional training grants at eight sites across the country in FY 2003, including conventional medical schools and universities, minority-serving universities, and a naturopathic medical school.

Beyond pre- and postdoctoral research training, NCCAM provides career development (K series) awards to new investigators seeking to sharpen their research skills, as well as to mid-career and senior scientists conducting CAM research. To date, most of NCCAM's career development awards have been granted to junior faculty, primarily those seeking to develop their skills in clinical and patient-oriented research.

NCCAM's Current Investigators

Many of NCCAM's extramural investigators approach their research from backgrounds corresponding to NCCAM's research priorities and directions. In keeping with the Center's initial emphasis on clinical research, NCCAM-funded researchers are more likely to hold a clinical doctorate than those of most other NIH Institutes. In addition, a substantial proportion of NCCAM's grantees are trained in fields such as pharmacology, physiology, and psychology, consistent with NCCAM's emphasis on understanding the mechanisms of action associated with CAM therapies and studying the role of mind-body interactions in health.

In FY 2003, nearly 50 percent of NCCAM-funded principal investigators were M.D.s or M.D./Ph.D.s; another 44 percent were Ph.D.s. Just over 3.5 percent of NCCAM grantees held clinical CAM doctorates, such as a D.C., N.D., or O.M.D.; of those, half had also earned a Ph.D. (Figure 2).

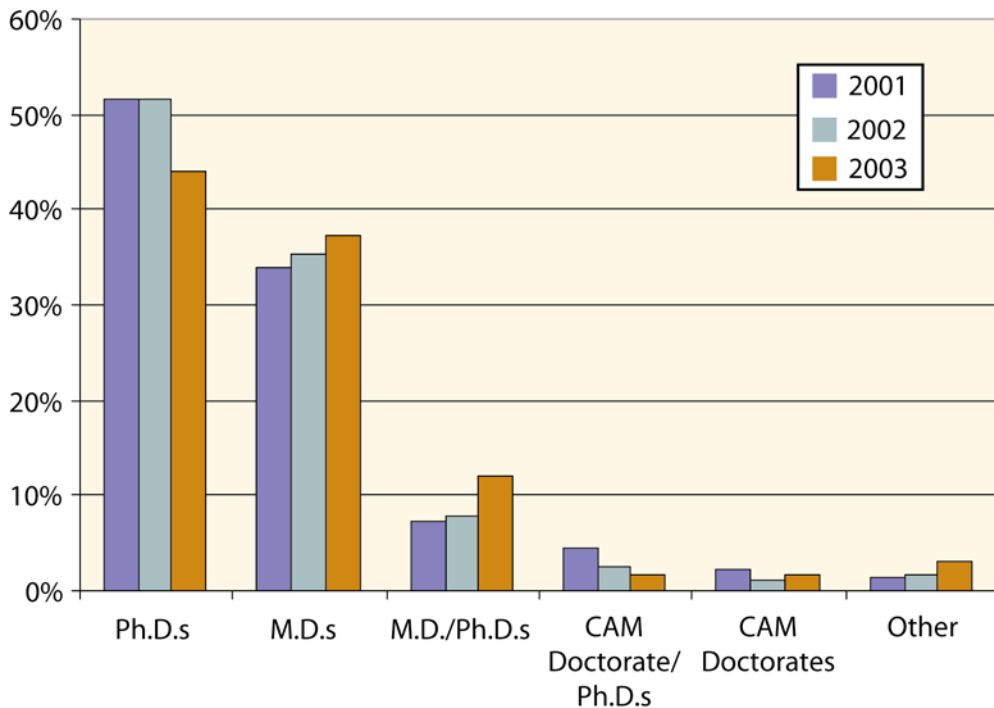


Figure 2. NCCAM-funded principal investigators, by degree, FY 2001–2003. Note: Principal investigators holding CAM doctorates include D.C.s, N.D.s, and O.M.D.s.

Among NCCAM’s principal investigators with a Ph.D. degree (whether held singly, or in combination with a clinical doctorate), the most common fields of training are pharmacology and pharmaceutical sciences, psychology, and physiology (Table 1).

Table 1. Research Training Backgrounds of NCCAM-Funded Principal Investigators Holding Ph.D.s, FY 2003	
Pharmacology/Pharmacy/Medicinal Chemistry	14.6%
Psychology (All Fields)	13.5%
Physiology	10.4%
Biochemistry	7.3%
Anatomy	4.2%
Botany/Plant Physiology	4.2%
Chemistry	4.2%
Engineering/Chemical Engineering/Biomedical Engineering	4.2%
Microbiology	4.2%
Neuroscience	4.2%
Nursing	4.2%
Nutrition/Home Economics	4.2%
Other	20.6%

Perspective of Current CAM Research Training Directors

In the course of their deliberations, working group members heard from directors of three NCCAM-funded research training programs representing a school of naturopathic medicine, a school of chiropractic medicine, and a conventional, research-intensive medical school, respectively. Although they had been selected to represent a wide range of perspectives, all three training directors emphasized the importance of a strong research program and adequate research infrastructure to research training.

The training directors at the two CAM institutions noted that the traditional focus of their universities has been on educating practitioners, not researchers. Undertaking research training has required these institutions to adopt a broader view of teaching and education and, correspondingly, of their faculties' roles and responsibilities. Not only does research training require different courses and curricula, it requires successful investigators who can serve as role models and mentors and resources ranging from well-equipped laboratories and libraries to administrative and technical support systems and personnel. But while their research infrastructure and resources may still be developing, CAM institutions have a strong advantage over conventional institutions, as their concentration of CAM expertise allows them to articulate and define some of the most compelling research questions in their respective fields.

The director of clinical research training at the conventional medical school noted that his institution was able to readily establish a new program for CAM research training because of the research culture of the institution and the range of related training programs and research studies already in place. Still, he noted, CAM research training can be challenging even in relatively resource-rich settings. For example, without substantial previous exposure to research, CAM practitioners may need additional training and experience before they are ready to undertake research projects independently. Furthermore, even after successfully negotiating training, new investigators from CAM practice backgrounds may find their job opportunities limited—more so than trainees from conventional medical or research backgrounds, who may simply apply the skills gained in CAM research training to other areas of research if an opportunity to pursue CAM research is not readily available.

NIH Approaches to Research Training and Career Development

Despite the differences between their particular fields of research, Institutes and Centers throughout NIH have come to recognize that successful research training programs commonly share certain fundamental characteristics. The most effective research training and career development programs tend to be situated in research-intensive institutions with sufficient resources, experienced investigators, and a range of ongoing research projects that can provide students and fellows with hands-on training experiences.

In addition, NIH research training administrators have found that institutional training grants best serve predoctoral students just beginning their studies by providing broad, general training that will give them a good grounding from which to specialize, as well as the skills to adapt to changing research opportunities over the course of their careers. By and large, specialized research training is better suited to advanced graduate students, postdoctoral fellows, and faculty.

Expert Panel Findings and Recommendations

Findings

Since 1998, NCCAM has introduced a broad array of training and career development opportunities in complementary and alternative medicine research, and today the first groups of NCCAM-funded trainees and fellows are completing their training at sites across the country. It is increasingly evident, however, that the long-term effectiveness of these training and career development programs rests on the availability of associated research resources: established investigators able to serve as mentors, a collection of ongoing CAM research projects, adequately equipped laboratories and libraries, and research administrators and support personnel.

These resources are typically in short supply in institutions with small or developing research programs, such as those devoted to educating CAM practitioners and underrepresented minorities. Major research-intensive medical schools and universities are generally much more likely to have established CAM research programs, experienced faculty, and other requisite resources for training. But even in these more conventional settings, CAM research remains relatively novel, and the effectiveness of CAM research training in these sites may depend on the availability of institutional resources and support.

NCCAM is strengthening CAM research resources and infrastructure through its support of centers of research excellence and developmental research centers at CAM and conventional institutions around the country and through the development of curricula in complementary and alternative medicine for both practitioners and investigators. There is some evidence that these efforts are having an impact, and they should continue to be carefully monitored and assessed.

Recommendations

To bolster the likelihood of successful research training outcomes, the working group members recommended that NCCAM underscore the importance of CAM research training and career development taking place in settings where there is a critical mass of ongoing CAM research, infrastructure, and mentors.

The group urged NCCAM to continue to provide research training and career development opportunities to those from both CAM and conventional backgrounds, and to persist in its efforts to recruit skilled investigators to CAM research. At the same time, however, working group members observed that the best locations for CAM research training may be conventional institutions—at least until more CAM institutions develop a solid research infrastructure and research culture. And until that point, if research training and career development activities *do* take place in CAM institutions, NCCAM may wish to consider taking steps to foster, and perhaps even require, collaborations with research-intensive institutions.

Even in conventional medical school and university settings, NCCAM should encourage training grant directors and mentors to take full advantage of available infrastructure for research and research training. For example, programs that provide clinical research training in CAM would be strengthened by collaborating with a local General Clinical Research Center or CAM research center. Similarly, CAM research training programs may be able to draw on research methods courses and course materials developed by other training and curriculum development programs at their institutions.

In allocating its research training support, the working group recommended that NCCAM continue to offer training opportunities to individuals ranging from predoctoral students to faculty, maintaining its current emphasis on training at the postdoctoral level and beyond. In particular, working group members urged NCCAM to consider a greater emphasis on cultivating established mid-career investigators willing to serve as mentors.

In determining which fields of research training to support, the working group suggested that NCCAM divide its research training and career development resources between disciplines that other NIH Institutes and Centers are unlikely to address, such as pharmacognosy, and conventional fields vital to CAM research, such as pharmacology, pharmacogenetics, biomechanics, and others.

As they considered the needs of specific groups of investigators, working group members advised that:

- Until CAM research is more established, institutional awards may be the preferred approach to training clinical investigators in CAM research because they are more likely to generate research training infrastructure.
- NCCAM should consider developing targeted awards for CAM practitioners pursuing research training and career development, to allow CAM practitioners to compete for opportunities among those with similar levels of exposure to research and research training.
- Because the transition from postdoctoral research training to an independent research career is likely to be even more challenging in CAM research than in conventional fields, NCCAM might fruitfully consider providing a “career transition award” to promising postdoctoral fellows.

Finally, in considering the question of recruiting underrepresented minorities to CAM research and training, the group concluded that the challenges are much the same as those in conventional medical research. Moreover, given the past record of NIH-sponsored research training programs at minority-serving institutions, the group members felt that CAM research training was not any more likely to result in more successful outcomes at minority-serving institutions than in other settings. As a result, the working group was hesitant to recommend that NCCAM renew its program of training grants targeted at minority-serving institutions. Instead, the group suggested that NCCAM underscore the importance of excellent research environments and successful faculty role models for all its trainees and fellows. In addition, NCCAM might consider identifying and placing more emphasis on CAM research topics of particular interest to minority populations.

In the long term, one of the best ways NCCAM can help ensure the success of its research training and career development programs and the strength and depth of the CAM research workforce is to continue its efforts to foster the development of research infrastructure and culture in CAM research, particularly at CAM institutions. For this reason, NCCAM may even wish to consider devoting additional funds to research training and resource development.

Conclusion

In reviewing the structure and focus of NCCAM's research training and career development programs, the working group commended NCCAM's approach to date. The breadth of NCCAM's research training activities is well suited for the scope of complementary and alternative medicine research and the range of investigators capable of contributing to the field. The working group urged NCCAM to continue to offer research training and career development opportunities to those from both CAM and conventional backgrounds, and to carry on its efforts to recruit experienced investigators from other fields to CAM research. Similarly, the group advised NCCAM to maintain its current distribution of support, which is oriented toward training at the postdoctoral level and beyond.

Yet, this early assessment of NCCAM's training and career development programs also reveals just how much their outcomes depend on the broader institutional environments in which they are located. To bolster the likelihood of successful research training outcomes in the future, working group members recommended that NCCAM emphasize the importance of CAM research training and career development taking place alongside active CAM research programs in settings with sufficient resources and mentors. For now, the sites most likely to fit that description are found mainly in conventional medical school and university settings. At the same time, however, NCCAM should continue its efforts to strengthen CAM research resources and infrastructure through its support of centers, curriculum development, and other awards that build research infrastructure. These parallel efforts will shape the future of research training in complementary and alternative medicine—and the future of CAM research.

Endnotes

¹ U.S. Congress. Senate. Committee on Labor and Public Welfare. *National Research Service Award Act of 1974*. 93rd Cong., 1st sess., 1973. S. Rept. 93-381.

² *The NIH Almanac*. Accessed at www.nih.gov/about/almanac/organization/NIGMS.htm on April 15, 2004.

³ National Research Council. *Addressing the Nation's Changing Needs for Biomedical and Behavioral Scientists*. Washington, D.C.: National Academy Press; 2000.

⁴ U.S. Congress. Senate. Committee on Labor and Public Welfare. *National Research Service Award Act of 1974*. 93rd Cong., 1st sess., 1973. S. Rept. 93-381.

⁵ *Number of Pre- and Post-Doctoral NIH Trainees Supported by Institute or Center, FY 1999 to FY 2002*. Accessed at grants1.nih.gov/training/data/tf_trends/sld006.htm on April 28, 2004.

⁶ Cherkin DC, Deyo RA, Sherman KJ, et al. Characteristics of licensed acupuncturists, chiropractors, massage therapists, and naturopathic physicians. *Journal of the American Board of Family Practice*. 2002;15(6):463-472.

Appendix A

Working Group on NCCAM Research Training

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Appendix B Meeting Agenda

National Center for Complementary and Alternative Medicine Research Training Working Group Hunt Valley Marriott May 24–25

Monday, May 24

1:30 p.m.	Welcome and Introductions	Donald Wilson, M.D.
1:40 p.m.	Charge to Working Group	Stephen Straus, M.D.
2:00 p.m.	NCCAM's Approach to Research Training and Career Development	Nancy Pearson, Ph.D.
2:15 p.m.	Challenges and Opportunities in CAM Research Training	Joseph Chu, M.D., M.P.H William Meeker, D.C., M.P.H Brian Strom, M.D.
3:15 p.m.	Break	
3:30 p.m.	Research Training and Career Development Strategies at the NIH	Walter Schaffer, Ph.D.
3:50 p.m.	Consideration of Questions and Discussion	Donald Wilson, M.D.
5:30 p.m.	Adjourn for the Day	

Tuesday, May 25

8:00 a.m.	Further Consideration and Discussion	Donald Wilson, M.D.
9:45 a.m.	Summary of Discussion and Next Steps	Donald Wilson, M.D.
10:00 a.m.	Working Group Adjourns	

Appendix C

Questions to Consider

1. Given that NCCAM's research interests overlap with a number of other NIH Institutes and Centers, how should it focus its research training resources? For example:
 - Should NCCAM direct more of its training funds to fields from which large proportions of its current investigators are drawn (i.e., pharmacology, psychology), but for which other NIH Institutes have ongoing general training programs?
 - Or should NCCAM concentrate more on filling gaps in research training that other NIH Institutes are unlikely to address (e.g., pharmacognosy)?
2. Which types of trainees would be best served by NCCAM funding in terms of future research productivity? For example:
 - Are NCCAM's current investments appropriately allocated among predoctoral and postdoctoral training and career development? Should any one stage of training or career development be emphasized or de-emphasized?
 - Should NCCAM consider doing more to facilitate the transition from postdoctoral fellowship to faculty positions (e.g., a K22 career transition award)?
 - Should NCCAM fund targeted training or career development awards for CAM practitioners? What types of research training experiences and research environments would be most conducive to preparing CAM practitioners to become productive scientists?
3. What approaches would best engender the development of clinical CAM investigators? What relative roles would be served by training through T32, K12, K30 awards? Should NCCAM do more to facilitate research training through General Clinical Research Centers?
4. What is the best approach to recruiting underrepresented minorities into CAM research? Should NCCAM continue to provide training grants targeted to minority-serving institutions? Or focus more attention on recruiting minorities to its other training and career development awards?
5. What strategies should NCCAM adopt to facilitate training for successful multidisciplinary and interdisciplinary research needed to study some of the domains of complementary and alternative medicine?